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ABSTRACT

Questionnaires were sent to 500 members of the National Council on Learning Disabilities and 500 members of the National Council of Teachers of Mathematics. Findings revealed a difference in attitude toward mathematics in the two groups and in attitudes toward learning disabled (LD) students in mathematics. LD teachers were more positive toward LD students in mathematics. Both groups had high expectations for the LD student in mathematics and felt that they should be included in the standardized achievement testing required of other students. Both groups agreed on mathematics content (basic skills objectives outlined by the National Council of Supervisors of Mathematics, consumer mathematics, numbers and numberation, and recreational math). LD teachers wanted to shift the primary responsibility for teaching mathematics to the mathematics teachers. Findings are further examined according to eight instructional theories. Eight questions for further research are raised. (CL)

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THE LD STUDENT IN MATH: TEACHER ATTITUDES - A SUMMARY

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Purpose of the Study

This nationwide study explored the background and experience of mathematics teachers and teachers of students with a learning disability to obtain information about the similarities and differences in their attitudes toward mathematics and toward the student with a learning disability in mathematics, their expectations about the learning abilities of the student with a learning disability in mathematics, their conceptions of quality content in mathematics, and their use of varied teaching strategies.

Setting

This study was conducted at the University of Denver in which 500 members of the National Council of Learning Disabilities and 500 members of the National Council of Teachers of Mathematics were randomly sampled to participate. A questionnaire was developed based on theories, questions, opinions included in the literature, and opinions held by experts in the fields of learning disabilities and/or mathematics. Experts in the field of learning disabilities and/or mathematics reviewed the questionnaire before the pilot study. The study was conducted from September 1983 to December 1983. The data were analyzed using SPSS programs.

Research Design

This was an attitudinal study which utilized a questionnaire as the vehicle by which data were gathered for intergroup comparisons. This was a descriptive research design. The hypotheses were tested by a two-tailed statistical test. Significance was set at the .05 level. Demographic data were used to determine and analyze which characteristics of the sample, if any, might reflect a bias on the part of the respondents.

Conclusions

The conclusions from this study are divided in three categories: those from the research hypotheses, those from the investigative issues, and those from the theories. These conclusions are based on the answers from the teachers of students with a learning disability group and from the mathematics teachers group.

Conclusions Based on the Research Hypotheses

The conclusions from this study based on the five research hypotheses are discussed in this section.

1. There was a difference in attitude toward mathematics between mathematics teachers and teachers of students with a learning disability. Both groups of teachers had positive attitudes toward mathematics; however, mathematics teachers had more positive attitudes toward mathematics than did teachers of students with a learning disability. The difference in attitude between the two groups probably reflects each groups' teaching specialization.
2. There was a difference in attitude toward the student with a learning disability in mathematics between mathematics teachers and teachers of students with a learning disability. Both groups of teachers had positive attitudes toward the student with a learning disability in mathematics; however, the teachers of students with a

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learning disability were more positive in their attitudes toward the student with a learning disability in mathematics than were the mathematics teachers. Again this difference in attitudes appears to reflect the area of teaching specialty.

3. Although there was a difference in teacher's expectations of the student with a learning disability in mathematics between the two groups of teachers, both groups of teachers had high expectations for the student with a learning disability in mathematics because they expected the students to be able to study algebra I and high school geometry succesfully. However, both groups of teachers indicated that they pace the student with a learning disability in mathematics commensurate with the student's ability and that they also give the student with a learning disability in mathematics more extra help than a regular student. Both groups of teachers agreed that a student's mathematics program should be based on the student's abilities, not disabilities thus supporting Beery's conclusion (Beery, 1980). Both groups of teachers agreed that the student with a learning disability in mathematics should be included in the standardized achievement testing required of other students. If these conclusions are representative then why is there so much discussion in the literature concerning minimal competencies? Perhaps the discussion in the literature reflects concerns about the area of language arts and is erroneously generalized to the field of mathematics.
4. There was no difference between the two groups of teachers in the selection of the mathematics content to be taught to the student with a learning disability in mathematics. Both groups of teachers agreed the student with a learning disability in mathematics needs to know the basic skills objectives outlined by the National Council of Supervisors of Mathematics (NCSM). In addition the teachers would emphasize consumer mathematics, numbers and numeration, and recreational math to round out a quality mathematics program. These objectives are not meant to be the maximum mathematical skills the student with a learning disability in mathematics can achieve. Both groups of teachers agreed the student with a learning disability in mathematics can go farther in the student's mathematical studies if allowed to use hand-held calculators. These conclusions again conflict with the emphasis on minimal competencies found in the literature.
5. There was a difference between the strategies used by the two groups of teachers. Both groups of teachers agreed that the mathematics teachers should teach mathematics to the student with a learning disability in mathematics with help from the teachers of students with a learning disability. The help can be in the form of consultation, tutoring, and monitoring of progress. Both groups of teachers agreed it is vital that the student with a learning disability in mathematics receive a quality mathematics program in order to become a functioning member of society. These conclusions demonstrate a need for a change in the current teaching roles of the two groups of teachers at all grade levels in order to deliver a quality mathematics program to the student with a learning disability in mathematics.

Conclusions Based on Investigative Issues

The six investigative issues were raised in this study and the researcher came to the following conclusions about these issues.

1. Teachers not only accepted the NCSM basic skills objectives but would add more consumer mathematics, numbers and numeration, and recreational math to create a quality mathematics program for the student with a learning disability in mathematics.
2. Teachers of students with a learning disability want to shift the primary resposibility for teaching mathematics to the student with a learning disability in mathematics over to the mathematics teachers.
3. Likewise mathematics teachers want help from teachers of students with a learning disability when teaching mathematics to the student with a learning disability in mathematics.
4. Both groups of teachers are willing to work together and share their expertise in order to better deliver a quality mathematics program to the student with a learning disability in mathematics.
5. This study was unable to resolve the issue whether or not teachers of students with a learning disability have the background to teach mathematics, especially at the secondary level (DCLD, 1978, pp. 17-19).
6. Likewise, this study was unable to resolve the issue of whether or not mathematics teachers have the background to teach the student with a learning disability mathematics at the secondary level (Taylor, 1981, p. 73).

Conclusions Concerning Theories

Eight theories were tested by this study. Most of the theories received positive support from the two groups of teachers. The results are given below.

1. Both groups of teachers agreed with Russell's theory that the student with a learning disability in mathematics can learn the same mathematics as non-learning disabled students if the student with a learning disability in mathematics is given more time to learn (Russell, 1981, p. 92).
2. Both groups of teachers agreed with the theory that the student with a learning disability in mathematics can learn the same mathematics as the non-learning disabled student if taught using different teaching strategies (Cawley, 1977, p. 209; Reisman & Kauffman, 1980; S. Johnson, 1979).
3. The teachers of students with a learning disability did not take as many mathematics courses as the mathematics teachers took but the teachers of students with a learning disability often took more than the minimum required number of mathematics courses. The demographic characteristics neither support nor negate Tobias' theory that people who studied the minimal amount of mathematics are more prone to math anxiety and have negative feelings toward the subject area (Tobias, 1978, p. 44).
4. Meyen suggested that labeling a student, such as "learning disabled," "handicapped," or "special education," has negative connotations (Meyen, 1978, p. 73-74). The results of this study do not conclusively support or negate the theory. The results do show a difference in attitude between the two groups of teachers but the difference appears related to the difference in teaching specialty rather than the issue of labeling.

5. The teachers responding to this study expect a lot from the student with a learning disability in mathematics. Society will benefit if these high expectations reflect a new trend for the future.
6. Brown believes that teachers of students with a learning disability teach mainly computation (V. Brown, personal communication, July 15, 1983). The responses indicate a preference by the teachers of students with a learning disability to tutor, support, and consult with students with a learning disability in mathematics instead of just teaching computation. The high expectations for the level mathematical achievement also indicate a recognition on the part of the respondents that computation alone does not constitute an adequate mathematics program.
7. Both groups of teachers supported Taylor's theory that the definition of minimal competencies in mathematics should be expanded to mean more than computation with whole numbers, fractions, and decimals by using the basic skill objectives outlined by the NCSM (Taylor, 1981, p. 71).
8. Swize's theory is supported by both groups of teachers who expressed a willingness to work together to provide a quality mathematics program for the student with a learning disability in mathematics. Furthermore, both groups of teachers agree that the mathematics teachers should have the primary responsibility for teaching mathematics with support from the teachers of students with a learning disability (Swize, 1982).

Recommendations for Further Research

Eight questions for further research are raised by this study.

1. Can a student with a learning disability in mathematics learn more mathematics than expected if allowed to use a hand-held calculator? Teachers in this study agreed that the student with a learning disability in mathematics can learn more difficult topics in mathematics if allowed to use a hand-held calculator. Related questions which should be asked include: "when is it appropriate to use a hand-held calculator," "to what extent can a student with a learning disability in mathematics benefit by using a hand-held calculator," and "which mathematical concepts best lend themselves to the use of hand-held calculators."
2. Can the student with a learning disability in mathematics complete the basic competencies required of other students? This study indicates that teachers favor completion of basic competency requirements by student with a learning disability in mathematics. Related questions include "is there a limit to the mathematical concepts a student with a learning disability in mathematics can master if given sufficient time and appropriate teaching strategies," and "if limits on mathematical learning are unique to each individual, is there a standardized method of determining what those limits are."
3. Can students with learning disabilities learn the NCSM basic skill objectives? The teachers responding to this study believe the student with a learning disability in mathematics should know all of the NCSM basic skill objectives. Are there some of the NCSM objectives which commonly present more learning problems to student with a learning disability in mathematics than others? If so, which are they and are there specific teaching strategies which can facilitate mastery of these objectives?

4. How do math anxiety, learned helplessness, hemispheric domination, and the language of mathematics interfere with the learning of mathematics? Students can choose to learn their basic facts or find alternative ways of coping. There are two distinct categories of coping (1) psychological manipulation of the environment (learned helplessness) and (2) physiological reactions to mathematics (math anxiety and math phobia). To what, if any, extent do teaching methods, the language of mathematics, or hemispheric domination correlate to the categories of coping? Is knowledge of hemispheric domination a key to which teaching strategies will be successful, unsuccessful, or neutral?
5. Can a test be developed to assess, rate, and/or identify a student with a learning disability in mathematics? The teachers responding to this study prefered using class work and student performance over testing and assessment to identify learning disabilities. If this is the case, can a standardized method of using class work and student performance be developed which will identify the student with a learning disability in mathematics?
6. Can a mathematics curriculum be developed for a student with a learning disability in mathematics? The teachers participating in this study agreed there is no special mathematics for the student with a learning disability in mathematics, just different teaching strategies. The NCSM objectives can be used as the foundation of a quality mathematics program which must rely on the teaching strategies suggested by Cawley, Sharma, Reisman and Kauffman, and S. Johnson. The roles of the mathematics teacher having the primary responsibility for teaching mathematics to the student with a learning disability in mathematics with support from the teachers of students with a learning disability need to be implemented.
7. Should the student with a learning disability in mathematics be included in the standardized achievement testing given to non-learning disabled students? If the answer is "yes," should and how should the directions, time limits, and the recording of answers be modified for the student with special learning needs?
8. How can teachers of students with a learning disability and mathematics teachers work together to contribute to descriptive research on the varieties of learning disabilities in mathematics such as math anxiety, mismatch between the developmental level of the curriculum and developmental level of the student, understanding the language of mathematics, faulty learning, and learned helplessness?

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